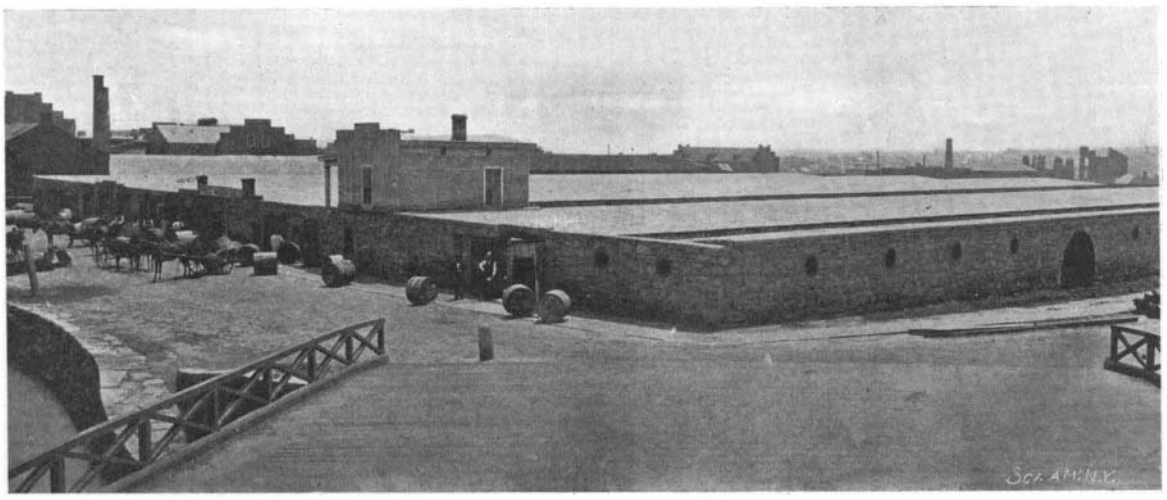
## THE TOBACCO INDUSTRY.

BY WALDON FAWCETT.

A new impetus has been given in recent years to the tobacco industry in the United States—ever one of the lines of enterprise most largely contributory to the material prosperity of the country. There can be no doubt but that these new conditions have been induced in part by the very extensive investigations relative to this plant which have been carried on during the past three years by the Division of Soils of the Department of Agriculture. A systematic study has been made of all the diseases of the crop, and the very important discovery has been made that the ever-troublesome fermentation is not caused by bacteria, as had always been supposed, but by chemical ferments produced by the tobacco plant itself. This discovery has suggested important modifications of the old methods of handling tobacco which promise much improvement in leaf tobacco, and will unquestionably be the means of adding millions of dollars to the wealth of the country. Tobacco was grown in this country long before the arrival of the first settlers, and served as legal tender during the early days of the colonies. However, the beginning of the last century found only the dark export types of Virginia and the light pipe-smoking tobacco of Maryland grown to any extent, and it has been within the century which has just closed that the cigar, lemon-yellow cigarette, mahogany manufacturing, Burley and Perique classes have been developed.

Even during the earlier years of the century, wherein the tobacco industry made such advancement, the rate of progress was slow. It was only when foreign consumers made an imperative demand for colored tobaccos that the utilization of artificial heat for curing was introduced. During the first quarter of the century wood fires were the only artificial means employed for curing tobacco. Then flues and charcoal fires were introduced; but it was not until after the civil war that flue curing entirely superseded charcoal fires in the production of the bright yellow varieties now used for cigarette, plug and twist wrappers.



OLD TOBACCO WAREHOUSE, RICHMOND, VIRGINIA.

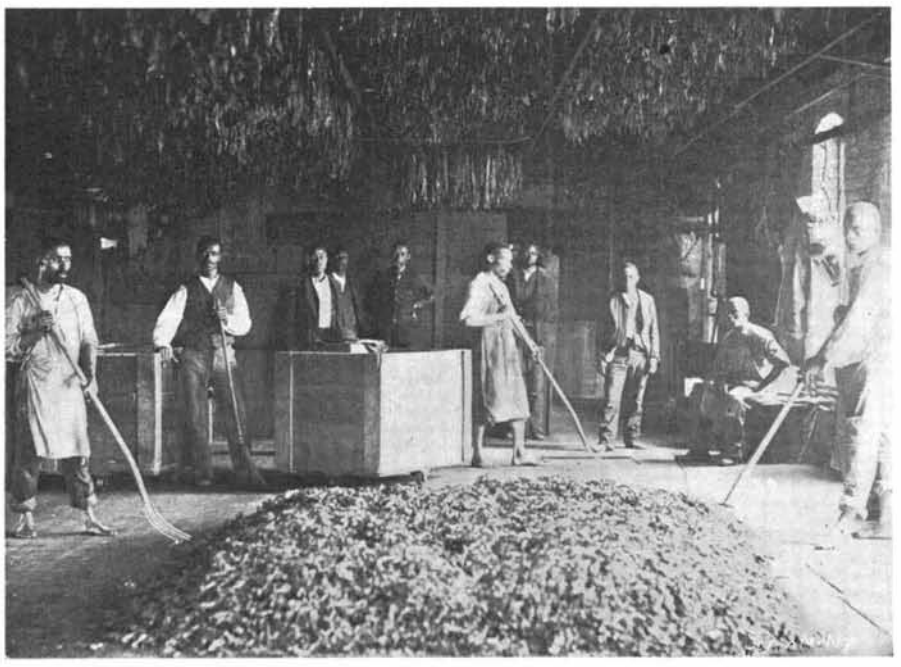
The States of Virginia and Maryland constituted the original seat of the tobacco industry. New England settlers attempted to cultivate it; but the first real extension of the industry was westward into Kentucky and Tennessee. The first crop of lemon-yellow tobacco was produced in 1852 on a sandy ridge in Caswell County, North Carolina, and the variety attained to such popularity that its cultivation spread rapidly, until the outbreak of the civil war, which conflict, of course, interrupted the culture for half a decade. In 1864 the White Burley tobacco was originated, and by reason of the absorbent powers of the leaf proved particularly well adapted for wrappers.

All the principal nations of the world purchase considerable quantities of tobacco from the United States. It is significant that each country differs in its requirements and in the character of the leaf used. Inasmuch as all the various countries are supplied from the same section of the country, and the differences in the tobaccos would appear to a casual observer to be very slight, considerable experience is required on the part of a packer to assort the various tobaccos into the grades suitable for each country, and to put the weed in the condition required by the particular country to which it is to be consigned.

These differences are, however, real and not imaginary as some persons might be inclined to suppose. For instance, Great Britain, which requires the best leaf and pays the highest price, demands a large leaf, olive green in color and so heavily smoked in curing that the odor of wood is apparent in the leaf. Africa, on the other hand, takes a long narrow leaf of heavy body, which is made very black by steaming and packing under heavy pressure in the hogshead while the tobacco is still warm. Oil is applied by means of a sponge to each layer as it is packed.

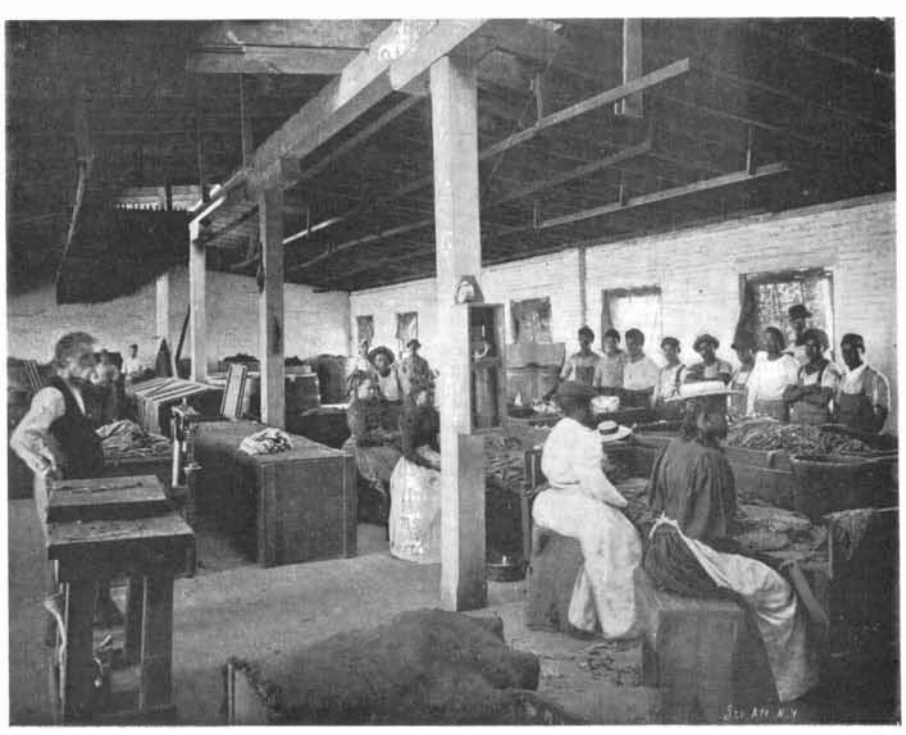
The curing of all the dark export tobaccos is effected by open hardwood fires. The Virginia tobacco is, generally speaking, somewhat superior to the yield from Kentucky and Tennessee, and consequently most of it is retained by the manufacturers in this country. The tobacco farmer usually assorts his harvest into "lugs," "good leaves," and "top leaves," but the

CUTTING TOBACCO LEAVES.



DRYING TOBACCO IN A WAREHOUSE.

STRIPPING TOBACCO LEAVES.



WRAPPING ROOM—CIGAR FACTORY.

final grading and treatment are left to the determination of the packer, who decides into which country each quality of tobacco shall be sent. The light tobaccos used exclusively for pipe smoking and cigarettes are produced principally in Maryland and Ohio. That grown in the former State is air-cured, while the Ohio product is cured by means of wood fires.

The agents of foreign countries who buy so many million dollars' worth of tobacco in this country purchase entirely by sample. The tobacco goes from the plantation to a large warehouse established for the inspection of the goods by State officers. When the tobaccos have been entered in the warehouse, a sworn and bonded inspector draws four samples from each hogshead, taken from different places and at equal distances apart, beginning near the bottom of the hogshead. These samples are tied together and after being sealed are labeled with the name of the owner, the number of the hogshead, the net and gross weight. When a hogshead is forwarded to a foreign purchaser the sample accompanies it, and if there be more than ten per cent of the tobacco in the hogshead poorer than the sample, the inspector, who is under bond, becomes liable for the difference.

Tobacco ordinarily grows from three to fourteen feet in height, according to climate and other conditions. The first step in its culture is the preparation of the seed bed, which in the South is done in January. Before the seeds are sown the ground is burned over in order to kill all foreign seeds and also produce an ash that acts as a fertilizer. The young plants when they attain to a prescribed growth are transplanted to hills in the field, where, after they have ripened, the entire plant is cut close to the ground.

The leaves go from the field direct to the curing house, where they are placed upon frames. Perhaps half a ton of tobacco is cured simultaneously, the process occupying some four or five days, and during this interval the leaves are kept in a temperature which is seldom below one hundred degrees and for hours at a time is nearly two hundred degrees. Then comes the packing according to the market for which the product is destined, as has already been mentioned.

The manufacture of cigars was begun in a small way in the United States in 1801, and the first factory was established about nine years later. At first the cigars were peddled about the country in wagons; but the demand increased rapidly. Just prior to the civil war the annual production of cigars in America was less than one-fifth of a billion. In 1875 it was nearly two billion, and in 1892 four and a half billion. The increase since that time has been even more rapid. The manufacture of cigarettes began during the civil war and gradually increased until several billion now constitutes the annual production. It was during the civil war, too, that the first governmental tax on the various manufactured forms of tobacco was imposed, although dealers and manufacturers were not required to take out licenses until several years later.

Formerly girls were employed extensively in the manufacture of cigarettes, but now the work is performed almost exclusively by machine. The cigar consists of three distinct parts, the wrapper and underneath that the binder, both of leaf tobacco, and the "filler," constituting about one-half the weight, of cuttings or fine shavings of the leaf. The cigar-maker rolls the filling rather loosely, and does not attempt to give it much shape until the binder has been wrapped around it. The outer wrapper is of course put on with considerable care, and then the cigar is trimmed to the proper length and placed in the bundle or box wherein it goes to market.

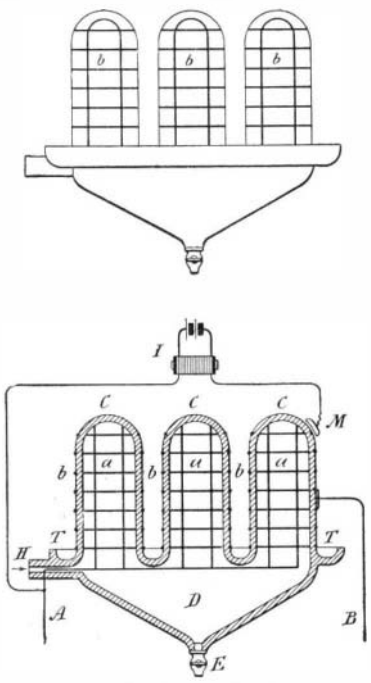
The portion of the population of the United States directly or indirectly dependent upon the tobacco industry would form a city considerably larger than Boston or Baltimore, and the annual wage paid to employes of the tobacco industries amounts to much more than the aggregate deposits of the three largest savings banks in the country. For half a decade past the exports of American tobacco to all countries have averaged 140,000 tons annually, valued at upward of $24,000,000.

### Christmas Island.

Sir John Murray, the eminent English explorer, has recently returned from a six months' expedition to Christmas Island, a small islet twelve miles in length by six miles in width, situated in the Indian Ocean, about 220 miles from land. The island is in reality a dense forest, but is famous for its rich phosphate deposits, the working of which constitutes the staple industry of the colony. The population comprises thirteen whites, including a doctor, chemist, and engineer, with their families, and 720 Indian coolies, all engaged in the phosphate mines. There is no anchorage, but a splendid open roadstead, and the depth of the water round the island varies from three to four miles. The most interesting features of the island are the animals and plants. The place is overrun with a curious red crab, specimens of which were discovered measuring about eighteen inches across the back. The most salient characteristic about them is that they are excellent tree climbers, and regularly once a year they migrate from the trees in one huge colony, like ants, to the sea to hatch their eggs, after which they return inland, the whole journey occupying about fifteen days. Sir John only discovered two mammals upon the island, which were species of rats hitherto unknown. One, which infests the coasts, is black in color, while the other, indigenous to the inland plateau, is brown. They are so abundant that a number of terriers have been imported with a view to their extermination. Sir John Murray experienced considerable trouble in piercing the forests to the central plateau, which is some 1,000 feet above sea level, owing to the prolific and thick growth of the vegetation. One night he lost his way and had to subsist upon the tops of sago palms. An administrative body has recently been dispatched to the island, and buildings for the public business are to be erected. The climate is perfect, resembling a hot English summer. Prior to the British annexation the island was uninhabited.

### NEW GAS BATTERY.

A new gas battery has been lately devised by a German inventor, Andrew Plecher, which presents some interesting peculiarities. The electromotive force is produced by the combination of hydrogen and oxygen, this being brought about by using the well-known properties of finely divided platinum. The diagrams show the section and exterior view of this battery, which consists of a series of chambers, *C*, made of a specially prepared material; for this purpose a mixture of clay or plaster with a solution of




NEW GAS BATTERY.

chloride of platinum is generally used. The vessels are dried and then baked so as to harden the material and decompose the platinum salt, when the metal assumes a finely divided state. In the interior of the vessel is a system of conductors, *a*, formed by rods or wires attached to the walls; the conductors of all the vessels are connected to a common terminal, *A*. On the exterior of the vessels is placed a similar system, *b*, connected to the terminal, *B*. The vessels rest upon a lower portion, *D*, with inclined walls, and having at the bottom an escape-cock, *E*. At the side is an opening, *H*, for the admission of the gas. The battery is put in action by introducing hydrogen by this opening, the battery being filled with the gas, while the oxygen at the exterior is furnished by the surrounding air. The two gases penetrate into the porous walls of the vessel and combine under the influence of the finely divided metal; water is formed by this combination, and this runs down the sides of the interior and is taken out at the bottom, while that formed at the exterior of the vessels is collected in a trough, *T*, surrounding these. This combination of the gases sets up an electromotive force between the terminals, *A* and *B*. It has been found that the combination of the gases may be increased by the action of an induction coil, *I*, whose secondary circuit is connected to the terminal, *A*, on the one hand, and on the other to an exterior conductor, *M*, placed at a short distance from the walls of the vessel. In this battery no electrolyte is needed; it is even best to get rid of the water as much as possible, and its evaporation may be hastened by a current of air. Palladium may be used instead of platinum, as its action is similar in this respect. The action is not confined to hydrogen and oxygen, but other gases may be used.

The chimes of St. Patrick's Cathedral, New York city, are now rung by compressed air, the bells being actuated through the medium of electrical devices.

### Automobile News.

There are at present 170 automobiles in use in the city of Brussels.

The Austrian military authorities have been experimenting for two years on the value of automobiles for conveying stores and ammunition, and they now intend to test the possibilities of transporting troops at this year's maneuvers.

The firm of Panhard & Levassor has come to America to obtain a sparker for the engines of their carriages. We refer to the auto-sparker made by the Motsinger Device Manufacturing Company, of Pendleton, Ind. One of the machines was sent over to France, and after exhaustive tests it was decided to adopt the auto-sparker, and the French patent was purchased. This is, we believe, the first instance where makers of motor carriages abroad, especially in France, where the industry may be said to have originated, have turned to America to obtain one of the most important parts for the construction of their vehicles, and it also shows how essential it is to take out French patents on mechanical devices of this nature.

A series of tests has been made on the tracks of the Northern Railroad, in France, with a new type of automobile passenger car. It has been built by Panhard & Levassor, and has a 4 horse power motor of the petroleum type. Two seats run along each side, accommodating 20 persons, and the conductor's place is in the middle, toward the front. The motor, placed in the front of the car, is thrown into gear by a clutch operated by a foot-lever, while a hand-wheel gives four speeds of 7, 11, 15, and 22 miles an hour. As the car is built to run upon the railroad track, the differential is naturally suppressed, and this has led to some other changes in the mechanism, especially that of the forward and reverse movement. The whole is now controlled from the same hand-wheel, and arrows indicate the direction of movement. The refrigerating tubes are placed upon the roof. This car is to be sent to Algeria and will be put in service over a section of narrow-gage railroad.

A service of motor omnibuses has been established in London. The company responsible for this energetic step is the Southwestern Motor Company, and the vehicles will ply through Batham, Streatham, Tooting, and Wandsworth, the most densely populated southwestern suburbs of the metropolis. Locomotion between these points and the City is very inadequate, so that probably the public will appreciate the new means of transit. The preliminary service consists of four cars which will travel at a maximum speed of twelve miles an hour. If the enterprise is successful other vehicles will be added, but since motor locomotion in London hitherto has been attended with failure, it was decided to carry out the experiment on a small scale. The vehicles are of the covered wagonette type with accommodation for eight passengers inside and two on the box seat with the driver. The sides are removable, so that in hot weather the cars will be quite open. They are handsomely finished in natural wood and run on broad rubber-tired wheels. The fare is two cents per mile at present, but if the enterprise is successful probably the tariff will be reduced.

The Chauffeur contains an interesting account of the automobile situation in Madagascar. There are few colonies where the automobile seems better adapted than Madagascar. The conditions in this country are somewhat special; on the one hand, the intelligence of the natives is considerably above the average, and on the other the capital, Tananarive, is situated in the center of the island, and united only by roads to its two supply-ports, Majunga and Tamatave. An automobile system between the first-mentioned town and the capital will soon be in operation, and the second line, from Tamatave to Tananarive, will shortly follow. For the latter, six of the most skillful operators from the Paris factories are about to start for the island with six machines of the Geo. Richard and Panhard types. These men will organize the system and train the natives to conduct the machines and keep them in order. It is proposed to run them with alcohol obtained from cane-sugar. In the first enterprise, under a French company, the machines are of the Panhard and De Dietrich makes; for these gasoline is to be used, but some trouble is expected on account of the rapid evaporation due to the heat. The second enterprise is headed by a native of Madagascar. It is proposed also to try the Koch automobiles, which use ordinary petroleum, upon both these systems. The roads, as it appears, are very fair, but one difficulty is experienced on account of the bridges, as at present these are made by trunks of trees bound together and thrown across the streams. Passengers and freight are now transported by native carriers, and the cost is naturally very high. Under these conditions any great amount of traffic with Tananarive would be impossible. The use of the automobile is therefore quite in order, and the result of the trials will be followed with interest. These are to be reported from time to time by the conductors in charge.